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A new genus and species of "goneplacid-like" brachyuran crab (Crustacea: Decapoda) from the Gulf of California, Mexico, and a proposal for the use of the family Pseudorhombilidae Alcock, 1900

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Abstract.—A new genus and species of crab, *Bathyrhombila furcata,* are described from localities in the Gulf of California, western coast of Mexico. The new genus is close to *Pseudorhombila* H. Milne Edwards and belongs to a group of three genera tentatively assigned to the subfamily Pseudorhombilinae Alcock, 1900 by Guinot in 1969. The affinity of *Bathyrhombila,* new genus, with other genera of "Goneplacidae" (*Euphrosynoplax* Guinot, *Pseudorhombila* H. Milne Edwards, *Nanoplax* Guinot, *Oediplax* Rathbun, and *Chacellus* Guinot) is discussed, noting that they all represent primitive transitional forms between the cyclometopous and the catometopous abdomen-sternum organization, and a similar "xanthoid-goneplacid" facies. On the basis of these affinities, it is proposed that these six genera be included into the family Pseudorhombilidae Alcock, within the Heterotremata Guinot, 1977.

Resúmen.—Se describe un nuevo género y una nueva especie de cangrejo, *Bathyrhombila furcata,* recolectado en localidades de el golfo de California, costa oeste de México. El nuevo género se parece a *Pseudorhombila* H. Milne Edwards y pertenece a un grupo de tres géneros tentativamente asignados a la subfamilia Pseudorhombilidae Alcock, 1900 por Guinot en 1969. Se discute la afinidad de *Bathyrhombila,* nuevo género, con otros género de "Goneplacidae" (*Euphrosynoplax* Guinot, *Pseudorhombila* H. Milne-Edwards, *Nanoplax* Guinot, *Oediplax* Rathbun, y *Chacellus* Guinot), señalando que todos ellos representan formas primitivas de transición entre la organización abdomen-esternón cyclometopes y catametopes, y una apariencia similar de tipo "xanthoideo-goneplacideo". En base a estas afinidades, se propone que estos seis géneros sean incluídos en la familia Pseudorhombilidae Alcock, dentro del grupo de los Heterotremata Guinot, 1977.

Two common and widely distributed families of brachyuran crabs, the Xanthidae and Goneplacidae (sensu Balss 1957) have long been recognized as containing heterogeneous groups of genera (see Guinot 1970, 1977, 1978; Serène 1984; Williams 1984; Martin & Abele 1986). In the last twenty years, the organization of the Xanthidae sensu Balss has been subject to many changes. The concept of a superfamily Xanthoidea proposed by Guinot (1978) emphasized the sternal position of female openings ("sternitrèmes") coupled with the coxal or coxo-sternal position of male genital openings, thus relating the Xanthoidea with the heterotremateous arrangement (Heterotremata, as defined by Guinot 1977). Guinot (1978) insisted on the fact that among the Xanthoidea, two groups of families should be considered: one with male

opening coxal, and another in which the male opening progressively migrates to a coxo-sternal position. In the later group, the evolutionary process is associated with a modification of the facies, which becomes goneplacid-like (Guinot 1978:266). Guinot (1978) also suggested that when all genera of Goneplacidae sensu Balss will have been reviewed, new families might be added to the second, goneplacid-like group of Xanthoidea (i.e., those genera with a coxo-sternal male openings).

A group of goneplacid-like brachyuran crabs presently included in the Goneplacidae has long been recognized as representing an intermediate step towards the transformation of the cyclometopous (heterotrematous) abdomen-sternum arrangement (male genital opening coxal; abdominal somites 1–2 covering entirely the space between the coxa of P5; sternite plate 8 entirely covered by these abdominal somites and not visible ventrally) into a catometopous arrangement (male opening sternal; sternite plates 7 and 8 widened, ventrally united and visible ventrally; abdominal segments 1–2 reduced, clearly separated from coxa of P5) (Guinot 1969a, 1978, 1979). For Guinot (1969b, 1970) this group of genera represents an evolutionary step towards the more advanced catometopous (thoracotrematous) organization in which the sternum occupies an increasingly wider area between the basal abdominal somites and the coxa of P5, and the male opening moves progressively towards a sternal position. Guinot (1970: 1076, 1080) suggested that several of these genera (i.e., *Pseudorhombila* H. Milne Edwards, 1837, *Oediplax* Rathbun, 1893, and possibly *Nanoplax* Guinot, 1967) could be integrated in the subfamily Pseudorhombilidae Alcock, 1900 pro parte.

Guinot (1969b: 721) also described the genus *Chacellus* Guinot, 1969b, monotypic at that time, which she considered ". . . [a genus with] une organisation très proche de l'organisation cyclométopienne et fait sans doute partie des Crabes formant le passage entre Cyclométopes et Catométopes [an organization close to the cyclometopous organization and probably belonging to the crabs linking the cyclometopous to the catametopous]." A second species of *Chacellus* was added by Hendrickx (1989a) who, despite of a "rather xanthoid facies," included it in the Goneplacidae with a "primitive catometopous organization." Another genus, *Euphrosynoplax* Guinot, 1969b was also described by Guinot (1969b:720), to accommodate an undescribed species of crab from Florida: *E. clausa* Guinot, 1969b. Again, Guinot (1969b) emphasized the primitive catometopous stage of this genus, relatively close to the cyclometopous arrangement. A second species of *Euphrosynoplax* was recently described by Vázquez-Bader & Gracia (1991) from the Gulf of Mexico. Although these authors did not clearly illustrate sternite eight, they refer to a (what appears as a primitive) catometopous organization of their species, *E. campechiensis,* with a ". . . male opening coxal [and] a small portion of sternite 8 not covered by the second abdominal somite."

The present paper deals with a new species of crab that present morphological similarities with those in the above cited genera. It is herein considered that this new species requires a new genus. Furthermore, the use of the family Pseudorhombilidae Alcock, 1900, is proposed for a group of six genera with a "xanthoid-goneplacid" facies representing primitive transitional forms between the cyclometopous and the catometopous abdomen-sternum organization.

Abbreviations used in this paper are: CW, carapace width; CL, carapace length; P2 to P5, pereiopods; Pl1 and Pl2, male first and second pleopods (gonopods), respectively; SEM, Scanning Electron Microscope; EMU, Estación Mazatlán UNAM, invertebrate reference collection; SIO, SCRIPPS Institution of Oceanography, invertebrates collection, La Jolla, California, U.S.A.; LACM, Los Angeles County Museum of

Natural History, Los Angeles, California, U.S.A.

Drawings were made with a camera lucida (Fig. 2). Holotype was photographed using a Kodak TMAX 100 ASA black and white film (Fig. 1), and SEM microphotographs of male gonopods were obtained using the classical technique of acetone dehydrated, gold-palladium coated gonopods extracted from type material (Fig. 3).

Bathyrhombila, new genus

Diagnosis.—Carapace 1.4 to 1.5 broader than long, anteriorly convex, slightly convex and narrower posteriorly; general shape "xanthoid". Antero-lateral margin arched, with 4 teeth, excluding the outer orbital tooth which is well-defined and slightly projecting; second and outer orbital teeth fused, forming an almost straight slightly projecting margin; length of this margin almost half the frontal width. Postero-lateral border converging posteriorly. Regions relatively well marked. Front narrow, less than ⅓ maximum width of carapace, slightly projecting forwards, with a shallow median depression, margin sinuous, with a well-marked notch between the external corner and the inner orbital tooth. Orbits reduced in size; eyes relatively small. Upper orbital margin slightly concave, with 2 distinct sutures; lower orbital margin with 2 strong teeth, inner one acute, outer one rounded. Antennal flagellum long, entering orbit; basal article of antenna relatively long, slightly oblique, in contact with front; a small apophyse intercalated between basal article and epistome (pterygostomian upper border); palp folding horizontaly. Interantennular septum broadly triangular. Third maxilliped with merus about 0.5 times length of ischium, antero-external angle slightly produced; palp articulating at inner distal angle of merus. Chelipeds large and robust, not markedly unequal in large males, subequal in females; carpus with a blunt, moderately large spine at inner angle; pincers very large, fingers flattened, pointed, tips recurved, gap between fingers reduced. A very conspicuous, strong pterygostomian ridge in front of cheliped articulation. Walking legs slender, long, flattened. Sternum moderately wide, narrowing in front of P1. Abdomen narrow in its base; segment 2 not overlapping coxa of P5. Abdominal segments 3–5 incompletely fused; suture 3–4 distinguishable, a remaining notch on both extremities; suture 4–5 obsolete, a remaining notch on both extremities. A small portion of sternite 8 visible, close to articular condyle of P5, not in contact with sternite plate 7. A shallow depresion in front of the abdominal telson. Male genital opening coxal and gonopod 1 free. Pl1 long, slender, with slightly curved apex; stiff subterminal spines, with stout and long lateral (apical) process and shorter, hook-like apical process. Pl2 short, sigmoid.

Type species.—*Bathyrhombila furcata,* new species, by original designation and monotypy.

Ethymology.—The name of the genus is a combination of *rhombila* and *bathys,* to indicate affinities with the genus *Pseudorhombila* H. Milne Edwards and the fact that most specimens were collected in the bathybenthic region.

Bathyrhombila furcata, new species
Figs 1–3

Material examined.—Holotype, male (CW 24.6 mm; CL 17.5 mm), 05 Jul 1965, station SIO 65-257, La Paz Bay (24°19′N, 110°26′W), Baja California, Mexico, otter trawl, 55–80 m (coll. W. Baldwin) (SIO C-2116).

Paratypes: male (CW 20.3 mm; CL 14.45 mm), 18 Jan 1968, station MV68-I-59, Gulf of California, north of Angel de La Guarda Island (29°41′N, 113°56′W), Baja California, Mexico, 566–644 m, otter trawl, R/V *T. Washington* (coll. C. Hubbs) (SIO C-5669A). Male, slightly damaged (CW 22.8 mm; CL 16.35 mm), 18 Jan 1968, station MV68-I-59, Gulf of California, north of Angel de La Guarda Island (29°41′N,

113°56′W), Baja California, Mexico, 566–644 m, otter trawl, R/V *T. Washington* (coll. C. Hubbs) (LACM-68-464.1, ex-SIO C-5669).

Non-paratypes: 1 soft shell male (cw 25.95 mm; CL 17.95 mm), 1 damaged soft-shell ovigerous female (CW ca. 17.9 mm; CL ca. 13.0 mm), 18 Jan 1968, station MV68-I-59, Gulf of California, north of Angel de La Guarda Island (29°41′N, 113°56′W), Baja California, Mexico, 566–644 m, otter trawl, R/V *T. Washington* (coll. C. Hubbs) (SIO-5669C).

Description.—Carapace wide (CW/CL ratio 1.40–1.46). Front narrow (7.05 mm wide in holotype), sinuous; fronto-orbital width (13.4 mm in holotype) about half the carapace width. Carapace anteriorly convex and mostly covered with small flattened granules, without setae; granules more numerous and rounded close to edges and on antero-lateral teeth. Antero-lateral margin with five teeth (including the outerorbital tooth), the posterior three large to medium-sized, conical; second teeth reduced, fused with the outerorbital tooth and forming an almost straight, little projecting margin; outerorbital tooth little produced, distinct. Fifth tooth smaller than the preceeding two; fourth teeth acute, pointing upward; third teeth wider that fourth and fifth, its sides at a right angle, flattened compared to fourth. Orbital lobe well-marked; upper orbital margin somewhat irregular, with small rounded granules and two conspicuous sutures (median and lateral); lower orbital margin with granulated inner tooth and outer lobe, both granulated. Outer orbital tooth well-defined, little projecting. Pterygostomian and subhepatic regions granulated. Pterygostomian ridge coarsely granulated.

Distal border of merus of third maxilliped sinuous, with a marked median concavity; antero-external angle little produced; merus coarsely granulated; ischium with more flattened granules, its distal border produced internally in a lobe; palp coarse.

Cheliped very strong, long (length of major cheliped ca. 1.75 CW); claw heavy and long (length of major claw about equal to CW), right claw being slightly higher (right/left claw maximum height ratio 1.09 to 1.12). Merus with granules on anterior and posterior sides, a dorsal row of granules and a blunt superior subterminal angle, produced in a low tubercle. Carpus strong, obliquely subquadrate in dorsal view, surface slightly irregular dorsally; clusters of granules arranged in rugae (well defined in the holotype) on outer slope; a blunt, moderately large spine at inner angle; a well-defined sulcus parallel to distal border. Manus inflated, smooth (microscopically punctated). Fingers long, flattened, pointed, strongly incurving and with recurved tips, gap between fingers reduced; length of dactylus of major claw ca. 0.4 times length of claw; dorsal margin of dactylus of major claw almost straight, that of major claw only slightly curved. Cutting edge of dactylus of both claws sharp, that of major claw with a strong, projecting subrectangular proximal tooth, followed by a series of irregular, smaller teeth; cutting edge of polex with a series of irregular teeth; cutting edges of smaller claw with reduced teeth.

Pereiopods 2–5 long, slender, flattened; merus covered with dense granules on lower and upper margin, sides almost smooth; carpus and propodus partly covered with granules on upper margin; a low, longitudinal granulated crest on upper margin of carpus; dactylus about same length as propodus, with longitudinal rows of setae, tip short, corneous. Pereiopods 2–4 subequal in length (P2 = 1.66 times CW; P3 = 1.69 times CW; P4 = 1.63 times CW), fifth pereiopod notably shorter (1.39 times CW).

A small portion of sternite eight of male abdomen visible between second and third abdominal somites; first and third somites slightly wider than second, second and third of about the same length and with subacute lateral margins; sixth somite wider than long, sides concave, narrower medially, distal and proximal margin equal; seventh somite (telson) as long as sixth, posteriorly

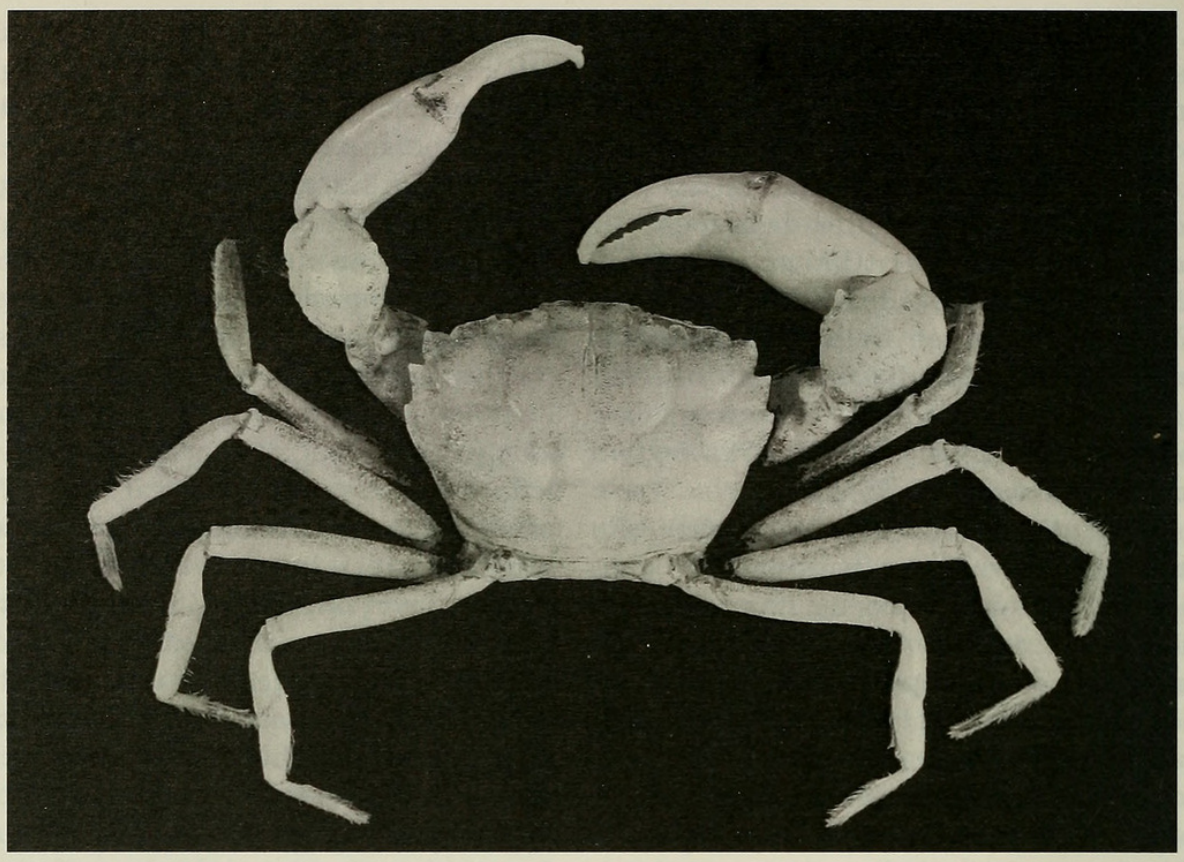

Fig. 1. Holotype, male, CW 24.6 mm, CL 17.5 mm, dorsal view, La Paz Bay, Baja California, Mexico (SIO C-2116).

rounded. First somite and lateral portion of second coarsely granulated; other somites with fewer flattened granules or almost smooth.

Female gonopores longitudinally oval; opening vertical.

First pleopod of male long, slender, bending and slightly curved distally. Two rows of small spines on the shaft; two series of 3 and 5 much longer distal spines on each side of the fold, close to the apex; a strong, spine-like subterminal process, and a terminal, hook-shaped shorter process; a cluster of spines on the side opposite to the fold; an obscure third lobe, covered with tiny spines, in front of the hooked process.

Ethymology.—The name of the species refers to the peculiar arrangement of the subapical setae of the male first pleopod, simulating a fork (*furca*).

Remarks.—The smaller male features more marked heterochely, the right claw being about 1.34 times the maximum height of the smallest whereas it is 1.11 in the holotype. The soft-shell male is also the largest male available but due to the lack of calcification this specimen has not been used as holotype. The only available female also features a soft-shell, and although basic characteristics match the description of the species, it was not designated as type material either. The bathymetric range of *B. furcata* is rather wide; the holotype was taken in trawl between 55 and 80 m, while the rest of the material was obtained in a single trawl from a depth of 566–644 m.

Discussion

Like several other genera included in the Goneplacidae or "Goneplacid-like" group (i.e., *Pseudorhombila, Nanoplax, Oediplax,* and *Chacellus*), *Bathyrhombila* represents a primitive evolutionary step towards a catometopous stage, in which an uncovered expanded sternite 8 unites to sternite 7. In

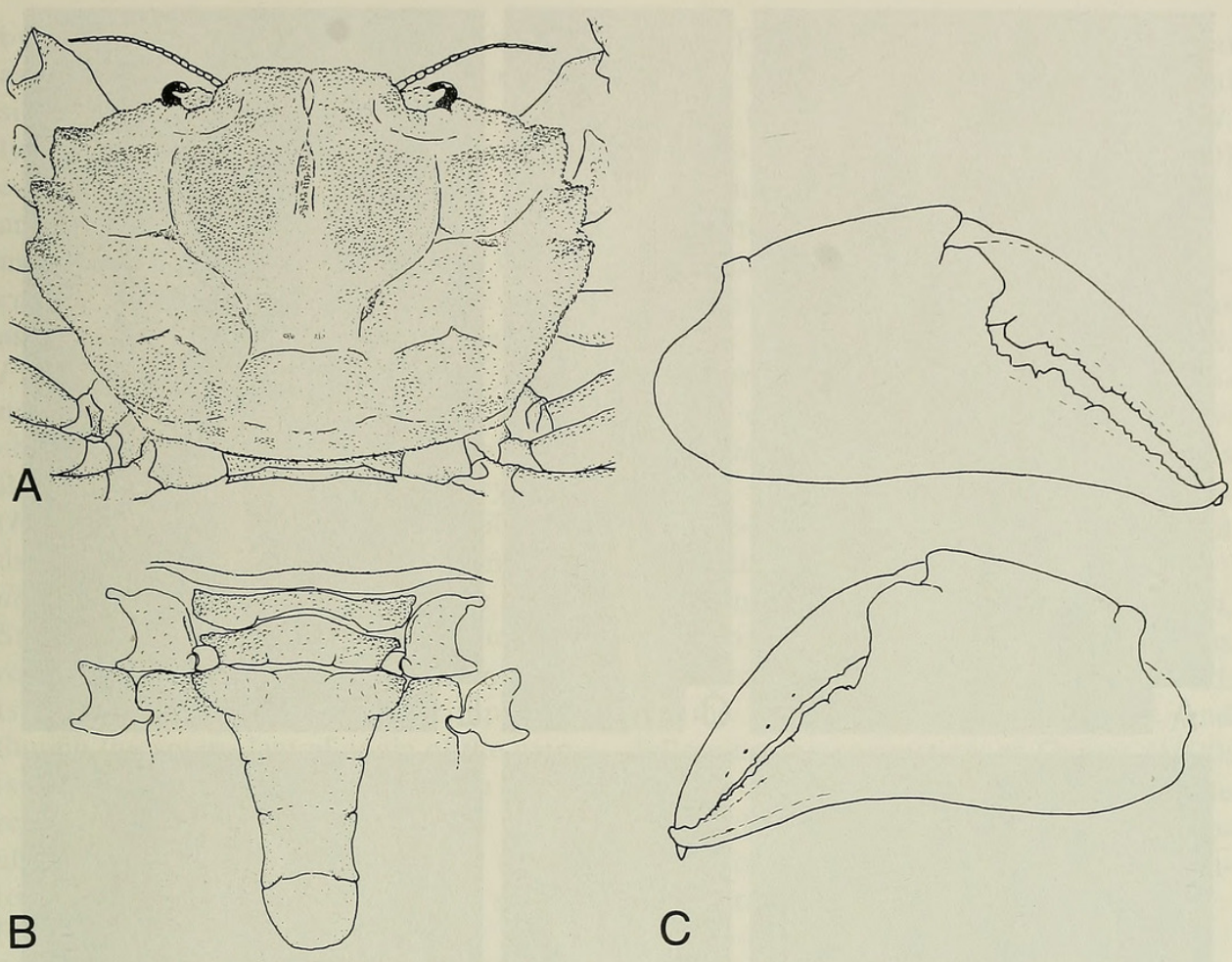

Fig. 2. Holotype male, CW 24.6 mm, CL 17.5 mm (SIO C-2116). A, dorsal view of carapace; B, dorsal view of abdomen and sternal plates 7–8; C, right (upper) (SIO C-2116) and left (lower) claws, frontal view.

the former four genera, the abdominal somite 2 is: notably reduced, its lateral margin straight and clearly separated from the coxa of P5 (e.g., *Oediplax granulata* Rathbun, 1893, type species of the genus; *Pseudorhombila xanthiformis* Garth, 1940; *P. octodentata* Rathbun, 1906); reduced but antero-laterally acute, in such a way that the acute corner is close to the coxa of P5 (e.g., *Chacellus pacificus* Hendrickx, 1989a); or antero-laterally acute and touching the coxa of P5 (e.g., *Nanoplax xanthiformis* A. Milne Edwards, 1880). In all cases, somite 2 leaves a reduced portion of sternite 8 visible at the basis of coxa of pereiopod 5. In *Bathyrhombila* the antero-laterally produced corner of somite 2 is almost in contact with the coxa of P5. In his study of *Bathyplax typhlus oculiferus* Miers, 1886, Tavares (1996: 420) note that the size of vissible portion of sternite 8 varies among specimens of a same species; data related to other genera, however, are lacking. *Pseudorhombila, Nanoplax* and *Oediplax* are considered by Guinot (1969b, 1970) as potential members of a series of "Goneplacidae" related to the Xanthidae, equivalent to the Pseudorhombilinae Alcock, 1900. Among the species of *Pseudorhombila,* the abdomen-sternum organization itself varies from a primitive step (sternites 7 and 8 appear not in contact in ventral view, male opening coxal: *P. xanthiformis*) to a more advanced phase [sternites 7–8 in contact on a short distance, in ventral view, displacement of the male opening towards a sternal position: *P. quadridentata* (Latreille, 1828), *P. octodentata* (Rathbun, 1906), and *P.*

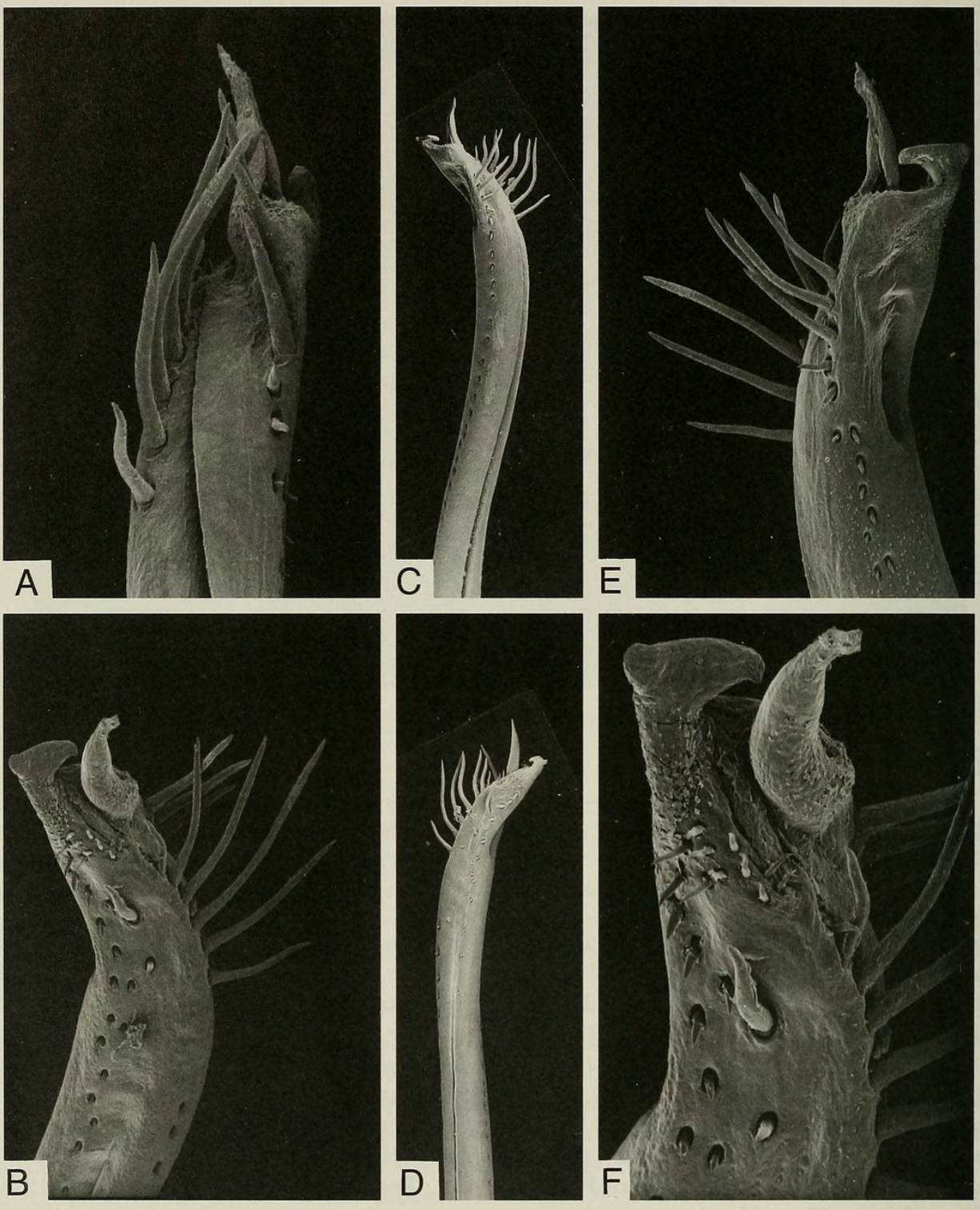

Fig. 3. Microphotographs (SEM) of male first gonopod (Pl1). A, B and E, F, paratype, male, CW 22.8 mm, CL 16.35 mm (LACMNH 68-464.1), slightly damaged, station MV68-I-59, Gulf of California, north of Angel de la Guarda Island (29°41′N–113°56′W), Baja California, Mexico, detail of extremity; C, D, holotype, male, CW 24.6 mm, CL 17.5 mm (SIO C-2116) distal portion (SEM photographs) (scale: A, F, 100×; B, E, 72×; C, D, 25×).

ometlanti Vázquez-Bader & Gracia, 1995]; this would make *Pseudorhombila* the most advanced genus of all.

The "faciès goneplacien" referred to by Guinot (1969a, b) is distinguishable in all the above mentioned genera (in particular considering the shape of the cheliped) and the pterygostomian ridge, also referred to

by Guinot (1969a, 242) as a ". . . caractère assez constant [in Goneplacidae], rarement signalé . . ." [a rather constant feature, rarely reported], is also present in all four genera (strong and sharp in *Oediplax*; strong and granulated in *Bathyrhombila*; strong to moderate in *Pseudorhombila*; weak in *Chacellus*). In the case of *B. furcata,* the general aspect of the crab relates it to species of *Pseudorhombila*; the carapace is similar, notably wider than long, with distinguishable regions and convex in lateral view. Both genera feature large to very large (*Bathyrhombila*), heavy chelipeds, although the heterochely is more marked in *Pseudorhombila.* Orbits and eyes are small. Structure of the frontal and antennular regions and of the bucal frame is similar, as is the shape of the third maxilliped, although the antero-lateral angle of the merus is not so produced in *Bathyrhombila* (in this respect, closer to *Oediplax*). Both genera also feature long (*Pseudorhombila*) to very long (*Bathyrhombila*), flattened, slender P2–P5. *Bathyrhombila,* however, differs from *Pseudorhombila* in the following characters: the exorbital and second teeth of carapace are fused, forming a wide, almost straight slightly projecting margin (exorbital tooth almost wanting in *Pseudorhombila*); the pterygostomian ridge, in front of the cheliped articulation, is much stronger in *Bathyrhombila*; the second abdominal segment is wider in *Bathyrhombila*; and the structure of the male Pl1 is strikingly different (Fig. 3). Considering the shape of the male gonopods, the slender Pl1 of *Bathyrhombila* is closer to Pl1 of *Chacellus* (*Pseudorhombila* and *Oediplax* possess a shorter, more massive Pl1). Ornamentation of the tip of Pl1 however, shows affinities with some species of Panopeidae Ortmann, 1893 such as *Lophopanopeus frontalis* Rathbun (see Martin & Abele 1986: fig. 1N). Although the "third" lobe (typical of Panopeidae) in *Bathyrhombila furcata,* new species is hardly distinguishable, the other two processes are strongly developed. In contrast, long subterminal spines (present on the Pl1 of *B. furcata*) are also observed on Pl1 of species of *Pseudorhombila* and on the type-species of *Nanoplax* [i.e., *N. xanthiformis* (A. Milne Edwards, 1880)] (Hendrickx 1995), with a single cluster of subterminal spines in the later.

Another genus close to the "Pseudorhombilid" organization is *Euphrosynoplax* Guinot. The visible portion of sternite 8, however, is smaller in *E. clausa* (the type-species of the genus) than in *Pseudorhombila, Bathyrhombila* and *Oediplax*; and is similar in size to sternite 8 of *Nanoplax xanthiformis* and the two known species of *Chacelus.*

When all these species are compared, they present striking similarities as far as their general shape and aspect is concerned. On the basis of these considerations, and following the suggestion of Guinot (1970; 1080), the use of the family-group name Pseudorhombilidae Alcock, 1900, is proposed for those genera of "goneplacid-xanthid" crabs.

Pseudorhombilidae Alcock, 1900

Pseudorhombilinae Alcock, 1900:286, 292, 297, pro parte.

Pseudorhombilinae.—Guinot, 1969b:706; 1971:1080.

Type genus.—Pseudorhombila.

Included genera.—Bathyrhombila new genus, *Chacellus, Euphrosynoplax, Nanoplax, Oediplax,* and *Pseudorhombila.*

Definition.—Carapace xanthoid, wider than long, with 3–5 (including outer orbital) antero-lateral teeth. Bucal frame widening anteriorly. Orbits of moderate or reduced size, oval. Chelipeds goneplacids, long, heavy, with long, strongly to moderately incurving fingers. Pterygostomian ridge (in front of chelipeds) strong to moderate. Abdominal somites 3–5 at least partially fused, sutures usually visible. Second abdominal somite reduced, its antero-lateral margin in contact with (anterior angle produced) or separated (margin straight) from basis of coxa of P5. Sternal plate wide and slightly

to moderately depressed between P1 (minimum width between P1 equal to 0.60–0.63 times maximum width between P2). A small to relatively large piece of sternite 8 visible ventrally; sternite 8 not touching sternite 7 in ventral view (Pl1 coxal) or in contact over a short distance (Pl1 displaced towards a sternal position). Pl1 long and slender or moderately long and strong; ornamentation variable. Pl2 short, strongly or moderately sigmoid.

Genera.—The family is divided into three groups of genera. Group A includes the most primitive catometopous forms (i.e., *Nanoplax, Chacellus, Bathyrhombila* and *Euphrosynoplax*); group B includes species with a larger visible piece of sternite 8 (*Pseudorhombila* pro parte and *Oediplax*); group C includes species with a larger visible piece of sternite 8 in contact over a short distance with sternite 7 (*Pseudorhombila* pro parte).

Remarks.—Among the Pseudorhombilidae, several species present a subtriangular hiatus between the ischium and the merus of the third maxilliped (e.g., *Chacellus pacificus*; both species of *Euphrosynoplax*; *Oediplax granulata*; *Pseudorhombila xanthiformis, P. quadridentata* and *P. guinotae* Hernández-Aguilera, 1982) while other species (e.g., *Chacellus filiformis* Guinot, 1969b; *Pseudorhombila ometlanti*) possess an anteriorly expanded lobe at the inner angle of the ischium that makes contact with the proximal margin of the merus (Hendrickx 1989a: table 1). The third maxilliped of other species have not been illustrated in the literature and specimens have not been available for examination. In *Nanoplax,* the partially-fused outerorbital and second teeth are much narrower than in any other genus included in the Pseudorhombilidae, although still separated by a shallow notch. The carapace of species of *Pseudorhombila* and *Oediplax* features a reduced to unconspicuous first anterolateral tooth and the fifth tooth varies from well (e.g., *P. octodentata*) to poorly developed (or obsolete) (e.g., *P. quadridentata*).

Provisional key to genera of Pseudorhombilidae

1. Distance between outer orbital and first anterolateral teeth much shorter than orbit width; these tooth partially-fused, separated by a shallow notch. Extremity of male Pl1 with a strong longitudinally projecting flange ..... *Nanoplax*
– Distance between outer orbital and first anterolateral teeth about equal to orbit width 2
2. Pl1 of male long, very slender and tapering, with only a few minute spines along the shaft ..... *Chacelus*
– Pl1 of male stout, strong, twisted, with median to large spines along the shaft and distal part 3
3. Outer orbital and first anterolateral teeth coalesced, forming an almost straight slightly projecting margin. Extremity of male Pl1 with two longitudinal series of very long spines ..... *Bathyrhombila*
– Outer orbital and first anterolateral teeth reduced, separated by a granulated space; granules coarse to minute 4
4. Merus of MXP3 not produced antero-laterally ..... *Oediplax*
– Merus of third maxilliped strongly produced antero-laterally 5
5. Extremity of male Pl1 with a strong subterminal or lateral upturned flange; a patch of strong spines just below the flange and series of weaker spines along shaft ..... *Pseudorhombila*
– Extremity of male Pl1 with a lateral flange; no patch of strong subterminal spines below the flange, but a series of moderate size spines along the shaft ... . *Euphrosynoplax*

Relationships between Pseudorhombilidae Alcock and the Panopeidae Ortmann are difficult to establish. As emphasized by Guinot (1969a:249, 250, and in lit.) this is due basically to the complexity of the Panopeidae sensu lato, of which a first group presents a xanthid facies and coxal male opening (e.g., *Eurypanopeus, Panopeus*), while a second group presents a goneplacid facies and coxal or coxo-sternal male opening (e.g., *Cyrtoplax, Glyptoplax*). Some

species of the Panopeinae second group (e.g., *Glyptoplax pugnax* Smith, 1870, the type species of the genus, and *G. consagae* Hendrickx, 1989b) present a sternum-abdomen organization more advanced towards a catometopous organization, with uncovered section of sternites seven and eight widely in contact and covering a groove through which the penis passes (see Hendrickx 1989b: 653). All members of the Panopeidae, including *Glyptoplax,* however, feature the typical "Panopeid" Pl1 ornamentation.

Specimens of the monospecific genera *Thalassoplax* Guinot and *Robertsella* Guinot were not available during this study. Both genera were briefly described by Guinot (1969b) to accomodate specimens erroneously identified by Rathbun (1918) as *Pilumnoplax elata* (A. Milne Edwards, 1880). Both genera are very similar primitive catometopous and feature distinctive male Pl1. Shape of carapace (see Guinot 1969: plate V) of both genera is apparently different from typical pseudorhombilids (carapace more squarish; wider front and orbits). Further studies will be needed to show if these two genera belong to the Pseudorhombilidae or not.

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Literature Cited

Alcock, A. 1900. Materials for a Carcinological fauna of India. No. 6. The Brachyura Catametopa of Grapsoidea.—Journal of the Asiatic Society of Bengal 69, 2(3):279–456.

Balss, H. 1957. Decapoda. *In* Dr. H. G. Bronns Klassen und Ordnungen des Tierreichs.—Fünfter Band, I. Abteilung, 7. Buch, 12. Lief: 1505–1672.

Garth, J. S. 1940. Some new species of brachyuran crabs from Mexico and Central and South American mainland.—Allan Hancock Pacific Expeditions 5(3):51–127.

Guinot, D. 1967. Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyoures. Les anciens genres *Micropanope* Stimpson et *Medaeus* Dana.—Bulletin du Muséum National d'Histoire Naturelle, 2e Sér. 39(2):345–374.

———. 1969a. Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyoures. VII. Les Goneplacidae.—Bulletin du Muséum National d'Histoire Naturelle, 2e. Sér. 41(1):241–265.

———. 1969b. Recherches préliminaires sur les groupements naturels chez les Crustacés Décapodes Brachyoures. VII. Les Goneplacidae (suite et fin).—Bulletin du Muséum National d'Histoire Naturelle, 2e. Sér. 41(3):688–724.

———. 1970. Recherches préliminaires sur les groupements naturels chez les crustacés brachyoures. VIII. Synthèse et bibliographie.—Bulletin du Muséum National d'Histoire Naturelle, Paris, 2e. Sér. 5:1063–1090.

———. 1977. Données nouvelles sur la morphologie, la phylogenèse et la taxonomie des Crustacés Décapodes Brachyoures. Thèse de Doctorat d'Etat ès Sciences, soutenue le 21 juin 1977 à l'Université Pierre-et-Marie-Curie. 2 vol. in fol., p. I–XV, 1–486, XVI–XXIV, 56 feuilles n.n., 78 Fig., 31 pl., 2 Fig. n.n., 14 tabl.

———. 1978. Principes d'une classification évolutive des Crustacés Décapodes Brachyoures.—Bulletin Biologique de la France et de la Belgique 112(3):211–292.

———. 1979. Données nouvelles sur la morphologie, la phylogenèse et la taxonomie des Crustacés Décapodes Brachyoures.—Mémoires du Muséum National d'Histoire Naturelle, Paris. Sér. A, Zoologie 112:1–354.

Hendrickx, M. E. 1989a. *Chacellus pacificus,* new species (Crustacea: Decapoda: Brachyura: Goneplacidae) from the continental shelf of the Gulf of California, Mexico.—Bulletin du Muséum National d'Histoire Naturelle, Paris. Sér. 4, 11, A(1):191–200.

———. 1989b. *Glyptoplax consagae* new species (Crustacea: Decapoda: Brachyura: Panopeidae) from the Gulf of California, Mexico, with some notes on the distribution of *G. pugnax* Smith, 1870.—Bulletin du Muséum National

d'Histoire Naturelle, Paris. Sér. 4, 11, A(3): 649–657.

———. 1995. Restitution de *Pseudorhombila xanthiformis* Garth, 1940, pour *Nanoplax garthi* Guinot, 1969 (Decapoda: Goneplacidae).—Crustaceana 68(1):12–20.

Hernández-Aguilera, J. L. 1982. *Pseudorhombila guinotae,* un nuevo crustáceo (Decapoda, Goneplacidae) en la costa Este de México.—Investigaciones Oceanográficas/Biología 1(4):1–16.

Latreille, P. A. 1828. Tourlouroux. Encyclopédie méthodique: histoire naturelle, entomologie, ou histoire naturelle des Crustacés, des Arachnides, et des Insectes. Paris 10:345–832.

Martin, J. W., & L. G. Abele. 1986. Notes on male pleopod morphology in the brachyuran crab family Panopeidae Ortmann, 1893, sensu Guinot (1978) (Decapoda).—Crustaceana 50(2): 182–198.

Miers, E. J. 1886. Report on the Brachyura collected by H.M.S. *Challenger* during the years 1873–76. *In* Report Scientific Research Voyage H.M.S. *Challenger.* Zoology part 49, 17, London, Edinburgh and Dublin, 1, 362 pp.

Milne-Edwards, A. 1873–1881. Études sur les Xiphosures et les Crustacés de la région mexicaine. *In* Mission scientifique au Mexique et dans l'Amérique Centrale. Rech. Zool. Faune Amérique Centrale et Mexique, part 5, vol. 1. Paris, Imprimerie Nationale. 368 p.

Milne-Edwards, H. 1937. Histoire naturelle des Crustacés, comprenant l'anatomie, la physiologie et la classification de ces animaux. Paris II, 532 pp.

Ortmann, A. 1893. Die Dekapoden-Krebse des Strassburger Museums. VII. Theil. Abtheilung: Brchyura (Brachyura genuina Boas) II. Unterabtheilung : Cancroidea, 2. Section : Cancrinea, 1. Gruppe : Cyclometopa.—Zoologische Jahrbücher 7:411–495.

Serène, R. 1984. Crustacés Décapodes Brachyoures de l'Océan Indien Occidental et de la Mer Rouge, Xanthoidea: Xanthidae et Trapeziidae. Avec un addendum par Crosnier (A.): Carpiliidae et Menippidae.—Faune Tropicale XXIV:1–400.

Rathbun, M. J. 1893. Descriptions of new genera and species of crabs from the west coast of North America and the Sandwich Islands. *In* Scientific results of explorations by the U.S. Fish. Commission Steamer "Albatross". No. XXIV.—Proceedings of the United States National Museum 16(933):223–260.

———. 1906. Description of a new crab from Dominica, West Indies.—Proceedings of the Biological Society of Washington 19:91.

———. 1893. The grapsoid crabs of America.—Bulletin of the United States National Museum 97: 1–461.

Smith, S. I. 1870. Notes on American Crustacea. No. 1. Ocypodoidea.—Transactions of the Connecticut Academy of Arts and Science 2:113–176.

Tavares, M. 1996. Sur la validité de *Bathyplax typhius oculiferus* Miers, 1886 (Decapoda, Brachyura).—Crustaceana 69(3):413–423.

Vázquez-Bader, A. R., & A. Gracia. 1991. *Euphrosynoplax campechiensis,* new species (Crustacea, Decapoda, Brachyura, Goneplacidae) from the continental shelf of southwestern Gulf of Mexico.—Bulletin du Muséum National d'Histoire Naturelle, Paris. 4e. Sér. 13(3–4):433–438.

———, & ———. 1995. A new crab species of the genus *Pseudorhombila* H. Milne-Edwards, 1837 (Crustacea: Decapoda: Goneplacidae).—Proceedings of the Biological Society of Washington 108(2):254–265.

Williams, A. B. 1984. Shrimps, lobsters and crabs of the Atlantic coast of the Eastern United States, Maine to Florida. Smithsonian Institution Press, 550 pp.